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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/927,003	08/08/2001	Byoung-Youp Kim	TJK/190/L.W.	4165

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EXAMINER

MECKS, TIMOTHY HOWARD

ART UNIT	PAPER NUMBER
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1762

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DATE MAILED: 04/17/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/927,003

Applicant(s)

KIM ET AL.

Examiner

Timothy H. Meeks

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-18 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-7 and 14-18 is/are rejected.
- 7) ☒ Claim(s) 8-13 is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s) ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other:

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DETAILED ACTION

Priority

Receipt is acknowledged of papers submitted under 35 U.S.C. 119(a)-(d), which papers have been placed of record in the file.

Claim Objections

Claim 5 is objected to because of the following informalities: At line 1, "gag" should be "gas". Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tobe et al. (6,080,446).

Tobe discloses a process for depositing TiN comprising evaporating TDEAT at a rate of 0.004 to 0.2 g/min and introducing it in a chamber holding a substrate, providing ammonia in the chamber at a flow rate of 10-100 sccm, providing a pressure of about 0.1 to 15 Pa, and providing a substrate temperature around 300 °C (col. 4, lines 15-25, and 31-32, col. 7, lines 55-56). Given the TDEAT evaporation rate range and ammonia flow rate range, the range of ratios of TDEAT evaporation rate to ammonia flow rate covered thereby overlaps with the claimed range. It would have been obvious to one of ordinary skill in the art at the time the invention was made to have selected the overlapping portion of the range disclosed by the reference because

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overlapping ranges have been held to be a prima facie case of obviousness, see *In re Malagari*, 182 USPQ 549. It is noted that the pressure of Tobe is slightly below applicants lower limit. However, it would have been obvious to have used pressures in the claimed range which are slightly above that disclosed in the prior art given the small difference with a reasonable expectation of achieving similar results.

With respect to claim 4, see col. 4, lines 14-30. With respect to claim 5, Tobe discloses nitrogen carrier gas rather than helium or argon but does not appear to limit the carrier gas and substitution of one inert carrier gas for another would have been obvious with the reasonable expectation of achieving similar results. With respect to claim 6, see col. 4, line 21. With respect to claim 7, see col. 6, lines 54-64.

Claims 14-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Tobe et al. in view of Jimba et al. (5,672,385).

Tobe does not explicitly disclose deposition in a chamber with walls having a heat exchanger for temperature control to the claimed temperatures. However, because Jimba discloses that such apparatus used to maintain a wall temperature of about 70 °C is effective for depositing TiN using the precursors and conditions disclosed by Tobe (col. 3, lines 35-50), it would have been obvious to have used such apparatus with a reasonable expectation of its being operable for depositing the TiN films.

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Allowable Subject Matter

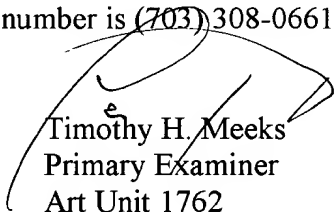
Claims 8-13 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The prior art does not teach or reasonably suggest use of the process conditions specified in claims 8 and 9 or the reactor specified in claims 10-13 for depositing the TiN under the claimed conditions.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy H. Meeks whose telephone number is (703) 308-3816. The examiner can normally be reached on Mon., Tues., Thurs.(6-6:30), Fri.(6:30-10:30).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Shrive P. Beck can be reached on (703) 308-2333. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9310 for regular communications and (703) 872-9311 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0661.



Timothy H. Meeks
Primary Examiner
Art Unit 1762

nf
April 14, 2003